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# Moderation of the effects of discrimination-induced affective responses on health outcomes

## Abstract

**Objective:** The goal of the study was to examine differential mediation of long-term effects of discrimination on health behaviour and health status by internalising (anxiety and depression) and externalising (hostility and anger), and to explore moderation of these effects, specifically, by the presence of support networks and coping tendencies.

**Design:** The current analyses employed structural equation modelling of five waves of data from Black female participants of the Family and Community Health Study over 11 years (M age 37–48).

**Main Outcomes Measures:** The main outcome variables were health status and alcohol use (frequency and problematic consumption).

**Results:** Perceived racial discrimination was associated with increases in internalising and externalising. In addition, internalising reactions to discrimination were associated with deterioration in health status and increases in problematic drinking; externalising reactions were associated with increases in frequency of drinking. These relations were attenuated by availability of support networks, and exacerbated by use of avoidance coping.

**Conclusion:** The current study (a) replicated previous research suggesting that two different types of affective reactions mediate the relations between perceived racial discrimination and physical health status vs. health-impairing behaviours: internalising and externalising, and (b) revealed moderation of these effects by coping mechanisms.

## Keywords

discrimination, health status, affective responses

## Disciplines

Health Psychology

## Comments

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## Moderation of the Effects of Discrimination-Induced Affective Responses on Health Outcomes

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A rapidly expanding body of research has indicated that perceived racial discrimination is a strong predictor of poor health and that this relation may be attributable, in part, to *unhealthy behavior* (Richman, Pascoe, & Lattanner, in press). For example, perceived racial discrimination has been associated with smoking (Bennett, Wolin, Robinson, Fowler, & Edwards, 2005; Landrine & Klonoff, 1996), increased alcohol use (Brown & Tooley, 1989; Sanders-Phillips, 1999), unhealthy eating (Pascoe & Richman, 2011), risky sex (Roberts et al., 2012), and sedentary life styles (Womack et al., 2014). In their meta-analysis of the literature on the discrimination - health behavior relation, Pascoe and Richman (2009) concluded that discrimination has a significant negative relation with health behavior, and that this relation is stronger for females than for males ( $r = -.26$  vs.  $-.14$ ).

## Emotional Responses as Mediators

### Internalizing reactions.

Recent examinations of mediators of the effects of discrimination on health behaviors and health outcomes has focused on the role of two different kinds of emotional responses to the stress induced by discrimination - internalizing (anxiety and depression) and externalizing (hostility and anger). Regarding the former, a study of Black parents and their children (part of the Family and Community Health Study [FACHS]) found that self-reports of discrimination were related to increases in anxiety and depression for both the parents and their children (Gibbons, Gerrard, Wills, Cleveland & Brody, 2004; see also Brown et al.,

2000; Klonoff, Landrine, & Ullman, 1999). This relation has also been found in a recent experimental study showing that young Black adults who were excluded by Whites in an online game of Cyberball attributed that exclusion to racial discrimination and reported increases in depression (Stock et al., 2017). Importantly, internalizing affective responses have consistently been associated with decreases in health status, including chronic illnesses, physical limitations, poor immune functioning (Dickerson & Kemeny, 2004; Robles, Glaser, & Kiecolt-Glaser, 2005), as well as risk for STIs (Roberts et al., 2012). In a prospective study, Schulz et al. (2006) found that increases in Black women's reports of discrimination were associated with increases in their reports of depression *and* decreases in reports of their general health.

### Externalizing reactions.

Not surprisingly, a number of prospective studies have shown that discrimination also elicits hostility and anger in Black Americans (Cleveland, 2003; Simons et al., 2006; Terrell, Miller, Foster, & Watkins 2006; see Pascoe & Richman, 2009, for a review). Once again, experimental studies have found similar results. Mendes and her colleagues manipulated social rejection by providing Black and White participants with bogus rejection feedback from other Black or White participants (e.g., "I would not like to be in a small class with the other subject"; "I would not like to get to know the other subject better"), and found that both Black and White participants who experienced *out-group* rejection reported increases in anger (Mendes, McCoy, Major, & Blascovich, 2008; cf. Jamieson, Koslov, Nock & Mendes, 2012).

### Substance use.

Research has also demonstrated that anger and hostility *mediate* the relation between discrimination and substance use. For example, a study with Black women and their adolescent children in FACHS (Gibbons et al., 2010, Study 1) found that the women's reports of discrimination were directly related to increases in their substance use (alcohol and drugs) five years later, and indirectly related to that substance use through increases in hostility. The adolescents' data revealed a similar pattern: discriminatory experiences reported at age 10–11 were associated with increased anger in the adolescents at age 12–13, and this anger mediated increases in their self-reported substance use at age 15–16. Study 2 in that paper provided experimental evidence of the same relations. A sample of FACHS adolescents (mean age 18.5) was instructed (or not instructed) to imagine experiencing discrimination in a work-related situation. Relative to the controls, participants who imagined the discrimination scenario reported more anger and more depression / anxiety; they also reported more willingness to use drugs. However, only the anger and not the depression / anxiety mediated the discrimination → drug willingness relation in that group. Similar results were reported in another experimental study by Stock et al. (2017) with a different sample. Collectively, these studies suggest that different affective responses to the stress produced by discrimination may be associated with different health-relevant outcomes.

## Differential Mediation

Social and health psychologists have provided direct evidence of different affective mediating pathways through which perceptions of discrimination turn into health behaviors, ultimately affecting health status (Major, Mendes, & Dovidio, 2013; Mendes et al., 2008). Very few of these studies, however, have adopted the perspective that stressors can elicit both internalizing and externalizing reactions simultaneously (cf., Carver, 2004; Carver & Harmon-Jones, 2009), and that these processes affect health in different ways. Nonetheless, there is reason to expect that *both* internalizing and externalizing reactions to perceived racial discrimination can co-occur, and may be associated with different health outcomes.

Externalizing affective responses are more strongly related to risk-taking behaviors (Lerner & Keltner, 2001; Rydell et al., 2008), including substance use (Aklin, Moolchan, Luckenbaugh, & Ernst, 2009). There is also experimental evidence of this effect: Jamieson et al. (2012) found that the anger produced by other-race rejection was associated with more risk-taking in a card game. In contrast, internalizing responses are more strongly associated with *avoidance* of risky behaviors<sup>1</sup> (Broman-Fulks, 2014; Giorgetta et al., 2012; Mitte, 2007). However they are also associated with increased *morbidity* and mortality (Moser et al., 2011; Mykletun et al., 2009; Rovner et al., 1991). These findings suggest that the relation between discrimination and both health status and health behavior may be explained by a “differential mediation” model - discrimination is associated with decreases in physical health and increases in health risk behaviors, with the former relation being mediated more by changes in internalizing responses, whereas the latter relation is mediated more by changes in externalizing responses. Analysis of four waves of data (covering eight years) from the Black women in FACHS supported this hypothesized mediational pattern (Gibbons et al., 2014). Discrimination was associated with increases in both internalizing and externalizing emotions, as well as an increase in alcohol use and a decrease in health status, all consistent with the literature. However, the prospective relation between discrimination and increased alcohol use was mediated by changes in externalizing, but not internalizing, whereas the relation between discrimination and decreases in health status was mediated by changes in internalizing, but not externalizing emotions.

## Moderators of Responses to Racial Discrimination

Establishing moderators of health risk factors improves our understanding of disease etiology and has the potential of informing the development of efficacious interventions (MacKinnon & Luecken, 2008). Although many studies have examined various factors that may moderate the relation between perceptions of discrimination and health status and health-impairing behaviors, to our knowledge, none have examined potential moderators of the effects of emotional reactions to discrimination-induced stress on health status *and* health-related behaviors. The current study examined two hypothesized moderators of these effects.

### Support networks.

Having social support networks, i.e., the presence or availability of friends and family members who can express concern and love, and provide coping assistance (Sarason et al.,

1983), is widely accepted as beneficial for both physical and psychological health (Cohen & Wills, 1985; Cutrona, 1996; Thoits, 1995). This kind of social support appears to be especially important for Black women (Garcia Coll et al., 1996; Lewis-Coles & Constantine, 2006; McLoyd, 1998). However, although it is commonly hypothesized that support networks are effective buffers of the link between discrimination and health status (e.g., Clark, 2003; Finch & Vega, 2003), the evidence of their efficacy is actually fairly weak (Brondolo et al., 2009; Pascoe & Richman, 2009). In this study, we test a specific version of the stress-buffering hypothesis: that support networks moderate the relation between internalizing reactions to discrimination and health status.

### **Avoidant coping.**

Motivational models of alcohol use suggest that people generally have two related but specific reasons for substance use: to enhance positive affective states, and to reduce negative emotional states (Cooper et al., 2008; Cox & Klinger, 1988). The latter motive - a form of avoidant coping, i.e., removing oneself from experiencing or thinking about a stressful situation (Carver et al., 1989) - is not a significant buffer of the effect of discrimination on physical health (Pascoe & Richman, 2009). But, it is more likely to lead to alcohol consumption and alcohol problems, as well as other types of substance use (Aldridge-Gerry et al., 2011; Cooper, Russell, & George, 1988; Merrill & Thomas, 2013). More relevant to the current study, Gerrard et al. (2012) examined moderation of the relation between discrimination-based stress and alcohol use by avoidant coping. Two lab studies, using different manipulations of discrimination, demonstrated that the relation between discrimination and willingness to use alcohol and drugs was stronger for young Black adults reporting that they used more avoidant substance use-as-coping strategies. A third, survey study, involving analyses of several waves of data from FACHS young adults, showed the same effect over time on willingness to drink and also on self-reported drinking. Finally, recent research has also suggested that a combination of both of these moderators - having a weak support network *and* employing avoidant coping - interact to increase perceived stress (Chao, 2011).

### **Frequency of drinking vs. problematic drinking: A racial crossover.**

Black adolescents in the U.S. start drinking later than White adolescents, and they are less likely to continue drinking into early adulthood (Malone, Northrup, Masyn, Lamis, & Lamont, 2012). However, this pattern changes in adulthood. Black adults who are heavy drinkers are more likely to continue heavy drinking after their early 20s (Costanzo et al., 2007), and perceived discrimination is a significant predictor of this trajectory (Madkour et al., 2015). More generally, among adult regular drinkers, Blacks are more likely than Whites to experience alcohol-related social and health problems (Godette, Headen & Ford, 2006; Keyes et al., 2012; Mulia, Ye, Greenfield & Zeng, 2009). Because of this distinction between drinking frequency and drinking consequences, in the current study, we chose to explore links from emotional reactions to discrimination to both frequency of drinking and problematic drinking.

## The Current Study

The goal of the current study was to expand existing research on differential mediation of discrimination effects through internalizing and externalizing emotional responses to long-term effects on health behavior (alcohol use) and health status. First, we sought to replicate the differential mediation effect (Gibbons et al., 2014) with new data collected when the FACHS women were three years older and their physical health had declined significantly (Figure 1 presents a heuristic model with the hypothesized pathways showing differential mediation). Second, unlike the previous study, which combined alcohol use and problematic drinking into one construct, we also examined differential mediation of paths to drinking frequency *and* the more consequential outcome, problematic drinking. Third, the current study tested the hypotheses that the link between internalizing responses to perceived discrimination and health status is moderated by the presence of support networks, whereas the link from externalizing responses to discrimination and frequency of drinking and problematic drinking is moderated by avoidant coping. Finally, we hypothesized that a combination of avoidant coping and poor social networks would be associated with problematic alcohol consumption (cf. Chao, 2011).

## Methods

### Sample

FACHS is an ongoing study of psychosocial factors related to the mental and physical health of Black families (Gerrard, Gibbons, Stock, Vande Lune & Cleveland, 2005; Gibbons, Stock, Vande Lune & Cleveland, 2004a). There were 889 families in the first wave (T1), half from Iowa and half from Georgia. Each family included a child who was in 5th grade at T1 and the child's primary caregiver (PC). Most PCs were female (94%); 90% of them were the biological mothers of the children (other PCs included grandmothers, stepmothers, and foster parents). The current analyses were conducted on a subset of the PCs: those who self-identified as African American or Black, and provided data in all five waves of data collection;  $N = 508$ . The women's mean age at T1 was 37 years ( $SD = 7.7$ ); at T5, it was 48 ( $SD = 7.6$ ). Their modal level of education was high school graduate; approximately 66% of them were single at T1. Retention across the five waves was  $> 65\%$ .

### Recruitment and Procedure

Families were recruited from small communities, suburbs, and small metropolitan areas, with mostly lower and middle class families. Of those families contacted, 72% provided data (the vast majority of those who declined cited the amount of time the interviews took - see below). Median family income for the families at T1 was \$20,685/year (\$31,297 in 2017 dollars); 33% of the families were living below the poverty line. For further description of the FACHS sample and recruitment, see Cutrona et al. (2005) and Gibbons et al. (2004b). All interviewers were Black. Interviews lasted ~ 3 hours and included a computer assisted personal interview (CAPI) as well as a structured psychiatric diagnostic assessment (the U. of Michigan Composite International Diagnostic Interview [UM-CIDI]; Kessler, 1991). Participants received \$100 at T1 to T3 and \$125 at T4 and T5. Average time between T1 and T2 was 24 months; it was 36 months between each of the other waves. The research was



approved by the IRBs at the universities involved; informed consent was obtained from participants at every wave.

### Measures (Waves of data collection for each measure are listed in parentheses)

**Perceived racial discrimination**—(T2/T3) was assessed with a 13-item, modified version of the Schedule of Racist Events (Landrine & Klonoff, 1996). This measure, one of the most commonly used in discrimination research (Pascoe & Smart Richman, 2009), describes various discriminatory events and asks how often respondents have experienced each type of event due to their race; e.g., “How often has someone said something insulting to you just because you are African American?” (1 = *never* to 4 = *several times*;  $\alpha$ s = .93 and .91). Lifetime discrimination measures like these are particularly useful for longitudinal studies (Williams & Mohammed, 2009), and appear to be more effective than daily discrimination measures at predicting health problems (Paradies, 2006; Williams, Neighbors, & Jackson, 2003). The 13 items were randomly parceled into three indicators of the latent construct.

**Negative affect**—(T1, T4) was assessed with five questions for depression: “During the past week, how much have you felt: hopeless / depressed / discouraged / like a failure / worthless for depression and tense / uneasy / keyed up for anxiety” (Cutrona et al., 2005). Each item included a 3-point scale: 1 = *not at all* to 3 = *extremely* (all four  $\alpha$ s for both waves > .78). The negative affect latent construct had these two indicators (depression and anxiety).

**Hostility / Anger**—(T1, T4) was assessed with two sets of items from the UM-CIDI that reflect two separate components commonly used in the health literature (cf. Kamarck, Manuck, & Jennings, 1990): hostile behavior (aggression against others) and anger. Hostile behavior items included five types of anti-social behaviors (lifetime), which pertained to harming others (e.g., “Have you... been in physical fights? ... threatened someone?”) plus two items about violence against their partner, which were combined into one measure (total  $\alpha$ s = .51 at T1 and .55 at T4). These six measures were then averaged to create one parcel of the latent construct. Anger was assessed with a single item: “You don’t get upset too easily” from 1 = *strongly agree*, to 4 = *strongly disagree*. Thus, once again, there were two indicators; in this case, one for hostile aggression and one for anger.

**Alcohol use**.—For the first model (a conceptual replication of Gibbons et al., 2014; see Figure 1), *alcohol use* was assessed with questions about drinking frequency and problems associated with alcohol consumption at T1 and T5. The second model separated the *frequency* and *problematic consumption* measures into two constructs at T1 and T5. At T1, frequency was assessed with two questions about drinking in the last 12 months (“How much alcohol have you typically consumed at each sitting during the last year,” and “In the past 12 months, did you have at least 1 drink... almost every day, 3 or 4 days a week, 1 or 2 days a week, 1 to 3 times a month, or less than once a month?” ( $\alpha$  = .77). Problematic consumption at T1 was assessed with six questions from the UM-CIDI about experiencing problems (lifetime) due to alcohol use (no/yes): fighting, problems at work, trouble with friends or family, problems getting along with others, being arrested (e.g., DUI), and being harmed while under the influence ( $\alpha$  = .84). The combined alcohol use scale at T1 had  $\alpha$  = .



81. At T5, alcohol frequency included five questions about consumption over the last 12 months: frequency of: drinking beer, wine, liquor, having 3 or 4 drinks in a row, and having 5 or more drinks in a row ( $\alpha = .77$ ). Problematic consumption at T5 included the six items from T1, plus four additional questions about problems, e.g., felt guilty about drinking, felt a need to cut down ( $\alpha = .94$ ). The T5 combined alcohol scale had  $\alpha = .94$ .

**Health status**—(T1, T5) was assessed with two single items at T1: a) current overall health status: “In general, would you say your health is?” from 0 = *excellent* to 4 = *poor* (which has been shown to be a good predictor of both morbidity and mortality; Idler & Benyamini, 1997; Jylha, 2009; cf. Williams, Spencer, & Jackson, 1999); and b) “Have you had a serious illness or injury in the past year?” (*no/yes*). At T5, the same measure of current overall health status was used, but the serious illness or injury question (which was endorsed by few women) was replaced with a scale comprising five items assessing the extent to which current health status and / or pain interfered with physical functioning, e.g., limited climbing stairs, interfered with work; each scored from 1 = *No, not limited at all*, to 3 = *Yes, limited a lot* (Ware, Kosinski, & Keller, 1996;  $\alpha = .90$ ). In addition, the health status questions included a number of chronic illnesses ever diagnosed by a doctor (e.g. high blood pressure, arthritis, asthma, diabetes; no / yes), and the number of prescription medications the participant takes or is supposed to take (total scale  $\alpha = .78$ ).

**Support network**—(T1) was assessed by four questions about close friends and relatives, i.e., “About how many close friends do you have?... How many of your relatives live less than 50 miles from your home?... How many of your partner’s relatives live less than 50 miles from your home?...” (all open answers, capped at a maximum of 11); “How often do you have contact with close friends, either in person, on the phone or by writing letters?” from 1 = “*I have no close friends*” to 7 = “*every day*”, responses to the questions were averaged ( $\alpha = .51$ ).

**Avoidant coping**—(T1) was assessed with four general questions about dealing with problems: “When you have a problem, you usually.... try to do things that will keep you from thinking about it..., try to forget about it... try to figure out the cause and do something about it..., talk to other people about it...”. Each item included a 4-point scale: 1 = *strongly agree* to 4 = *strongly disagree*. Items were coded so that higher scores indicated a coping style focused more on avoidance and less on problem solving ( $\alpha = .34$ ).

**Covariates**—(T1)—Five variables that have been linked with physical health status and/or substance use were included as covariates: age, SES (income and education), negative life events (28-item checklist; e.g., close friend or relative died, relationship break-up), financial stress (6 items; e.g., ability to pay bills, buy clothing), and neighborhood risk (7 items; e.g., drinking in public, gang violence). Covariates and exogenous (T1) constructs were allowed to correlate, and the relations between all of the covariates and the endogenous constructs were estimated.

## Results

The results are reported in four sections. The first section presents information on the outcome measures. Section two presents results from the first structural equation model (SEM), which examined whether the differential mediation reported in Gibbons et al. (2014) was replicated in the sample at T5 (when the women's *M* age was 48 – three years older than in the outcome wave in the previous study). In section three, the alcohol use constructs were separated into those that assess frequency and those that assess problems related to drinking, and the mediation paths for each were examined separately (in the whole sample). Finally, the fourth section examines moderation of the paths from internalizing and externalizing to health status and alcohol outcomes by support networks and avoidant coping, employing multigroup SEMs to compare responses of women with high and low scores on these moderators.

### Part 1: Health and Alcohol Outcomes

At T2/3,<sup>2</sup> more than 90% of the sample reported experiencing some discrimination, and approximately 20% reported large amounts of discrimination. The most common health problems were pain interfering with activities (44%) and limitation of moderate activities (such as climbing stairs) due to health problems (35%). To examine change, repeated measures ANOVAs were conducted on the outcome measures that were available in both T1 and T5. Overall health status deteriorated significantly during this time period ( $p < .001$ ), and reports of frequency of drinking increased, i.e., 20% reported more than minimal drinking at T1, whereas 33% did at T5 ( $p < .001$ ). Direct comparisons between T1 and T5 problematic consumption were not possible because of the change in wording of items between these waves. Consistent with previous literature (Mulia et al., 2009), there were relatively few regular drinkers at T5 (< 20% drank every week or more) within that group, however, 60% of them reported at least one alcohol-related problem in the last year.

### Part 2: Differential Mediation: A Replication Out to T5 (Whole Sample)

A confirmatory factor analysis (CFA) conducted to test the fit of the measurement model matched that in Gibbons et al. (2014) and provided good fit to the data:  $\chi^2$  (145,  $N = 508$ ) = 326.77,  $X^2$ :  $df$ ratio = 2.25; CFI = .95, TLI = .91; RMSEA = .05.<sup>3</sup> T2/3 discrimination was correlated with T4 negative affect and T4 hostility ( $r$ s = .18 and .13,  $p$ s < .005). In addition, both T4 negative affect and hostility were significantly correlated with T5 health status and alcohol use ( $r$ s from .12 to .26,  $p$ s < .01). Lagrange multipliers (modification indices) were used to detect any unspecified paths that could improve the fit of the model when moving from the CFA to the SEM. The SEM also fit the data well:  $\chi^2$  (163,  $N = 508$ ) = 358.10,  $X^2$ :  $df$ ratio = 2.20; CFI = .94, TLI = .92; RMSEA = .05. Stability paths for internalizing and externalizing (T1 to T4) and for both outcome measures (T1 to T5) were moderate to strong (all  $r$ s > .35,  $p$ s < .001).

Consistent with the Gibbons et al. (2014) study, discrimination at T2/T3 was associated with increases in internalizing and externalizing at T4 (standardized coefficients:  $\beta$ s = .12 and .19, respectively,  $p$ s < .03). More important, T4 hostility was associated with change in alcohol use from T1 to T5 ( $\beta = .17$ ,  $p = .01$ ), and T4 negative affect was associated with change in

health problems over the same period ( $\beta = .20, p < .01$ ). The indirect path from discrimination to change in health problems through change in negative affect was also significant ( $\beta = .02, p = .05$ ), and the indirect path from discrimination to change in alcohol use through change in hostility was marginal ( $\beta = .03, p = .08$ ). In addition, a modification index called for a direct path from T2/3 discrimination to T5 health (a 6- to 9-year lag;  $\beta = .13, p = .01$ ). With the exception of this direct path, all coefficients in this model are consistent with those in Gibbons et al. (2014); however, the indirect mediation of the discrimination to alcohol use by hostility -- for the entire sample -- was only marginal.

### Part 3: Drinking Frequency vs. Drinking Problems: Whole Sample

The second model divided the alcohol questions into those assessing alcohol frequency and those assessing alcohol problems and tested the association of negative affect and hostility with changes in both of these new constructs. The CFA on the variables included in this model indicated that it fit the data well:  $\chi^2(163, N = 508) = 358.30, X^2: df \text{ ratio} = 2.20$ ; CFI = .95, TLI = .90; RMSEA = .05; as did the SEM:  $\chi^2(191, N = 508) = 406.05, X^2: df \text{ ratio} = 2.13$ ; CFI = .94, TLI = .91; RMSEA = .05. Once again, the correlations reveal moderate to strong stability of T1 to T4 or T5 assessments (8- and 11-year lags) of negative affect, hostility, health status, alcohol frequency, and alcohol problems ( $r$ s range from .30 to .44,  $p$ s < .005; see Table 1).

This model replicated the paths from discrimination to changes in internalizing and externalizing, and the path from internalizing to health status (coefficients for this model are presented in italics in Figure 2). Consistent with the correlations, internalizing was associated with problematic drinking ( $\beta = .18, p < .001$ ), and the indirect path from discrimination to problematic drinking through negative affect was significant ( $\beta = .02, p = .05$ ). In contrast, externalizing was only marginally associated with increases in frequency of drinking ( $\beta = .10, p = .11$ ), and the indirect path from discrimination to alcohol frequency through hostility was not significant ( $\beta = .02, p = .19$ ). Finally, as expected, the paths from externalizing to alcohol problems and from internalizing to alcohol frequency were not statistically significant (both  $p$ s > .65).

### Part 4: Moderation of the internalizing and externalizing responses to discrimination

Dichotomous variables were created using a median split for support network (0 = weaker, 1 = stronger), and avoidant coping (0 = less, 1 = more), and two “stacked” (multigroup) SEMs were performed, one for each moderator (see Figure 2). All paths were allowed to vary, except the stability paths. In this model both support network and avoidant coping significantly moderated two paths from T4 affective responses to T5 outcomes, i.e., there were statistically significant reductions in model fit when the two paths for each of the groups were constrained to be equal.

**Support networks.**—The path from T4 negative affect to T5 health status had coefficients that were significantly different for women with strong vs. weak support networks ( $\chi^2(1) = 9.31, p < .003$ ). As expected, the association between T4 negative affect and T5 health problems was significant for women with weak support networks ( $\beta = .30, p < .01$ ), but not for those with strong networks ( $\beta = .07, p = .29$ ). Similarly, the association between T4

negative affect and T5 alcohol problems also varied as a function of support network ( $\chi^2(1) = 5.11, p = .02$ ). The path was significant for women with weak networks ( $\beta = .23, p < .01$ ), but was marginally significant for those who had stronger networks ( $\beta = .10, p = .08$ ). Finally, the indirect paths from T2/3 Discrimination to both T5 health problems and T5 alcohol problems through negative affect were significant for the low support group (both  $ps < .05$ ), but not for the high support group (both  $ps > .15$ ).

**Avoidant coping.**—As indicated, the alpha for the avoidant coping scale was very low; so, even though the pattern on these moderation analyses was as hypothesized, caution is warranted in interpreting the results. The association between T4 hostility and T5 alcohol frequency did differ as a function of coping ( $\chi^2(1) = 5.16, p = .02$ ), as it was significant for women who reported more avoidant coping ( $\beta = .23, p = .02$ ), but not for those who reported less avoidant coping ( $\beta = -.07, p = .44$ ). Similarly, the association between T4 negative affect and T5 alcohol problems also differed for the two groups ( $\chi^2(1) = 4.20, p = .04$ ), and again, it was significant for women who reported more avoidant coping ( $\beta = .28, p < .01$ ), but not for those who reported less avoidant coping ( $\beta = .05, p = .46$ ). The indirect effect from T2/3 discrimination through negative affect to T5 alcohol problems was significant for the high avoidance group ( $p < .04$ ), and the indirect path from T2/3 discrimination to alcohol frequency was marginal ( $p < .10$ ). Neither of these indirect paths was significant for the low avoidance group (both  $ps > .45$ ).

**Avoidant coping and support networks.**—Finally, to assess the combined effect of both moderators on the path from internalizing to problematic alcohol consumption, we conducted a regression analysis that included the interaction between support network and avoidant coping. The significant interaction indicated, as expected, that for those women who have a weak support network *and* a tendency to employ avoidant coping, discrimination was strongly predictive of more problematic drinking ( $\beta = .89, p = .002$ ; cf. Chao, 2011).

## Discussion

### Emotional Responses to Discrimination

One goal of the current study was to further examine the differential mediation model (Gibbons et al., 2014), initially by extending it out to a later wave. In this new model, the effect of discrimination on anxiety and depression was again strong, as was the effect of these internalizing responses on health status. Similarly, the effect of discrimination on externalizing was also significant, as was the path from hostility and anger to the combined alcohol use measure. In short, with one exception, the results paralleled those from the earlier study, this time with outcomes three years later. The difference was that in this new model, the indirect path from discrimination through hostility to alcohol frequency was not significant (for the whole sample). Instead, these analyses revealed new evidence that the relations between both types of affective reactions to discrimination and health outcomes are moderated by different factors.

## Coping

Results of the stacked model revealed moderation of the path from hostility to frequency of drinking by avoidant coping: Women who indicated they tend to deal with problems by avoiding thinking and/or doing something about it drank more often and reported more problematic drinking after experiencing discrimination than did women who did not report this coping style. This kind of coping style is not surprising, given that many of these women probably assumed there was little they could actually do about the stressor. Moreover, there is evidence that some Blacks engage in another form of avoidance, “discrimination denial” (Crosby, 1984; Ruggiero & Taylor, 1997) as a means of coping with the stress. In any case, the coping results are consistent with a large body of research suggesting that avoidant coping can be effective in the short run, but has negative effects on health behavior and health status in the long run (Ben-Zur, 2009; Suls & Fletcher, 1985; Wolf & Mori, 2009). The current data also suggest, however, that Black women who respond to discrimination with externalizing emotions, but do not engage in avoidant coping, may turn to alcohol to mute their discrimination-related stress without escalating to high levels of consumption or without experiencing alcohol-related problems.

## Support

As noted in reviews of the relevant research (e.g., Brondolo et al., 2009; Pascoe & Richman, 2009), it has been assumed that support networks are effective buffers against the negative effect of perceived racial discrimination on physical health; however, evidence of the efficacy of this coping mechanism has been limited. This study does provide evidence of these network buffering effects: the women in this study who reported having strong support networks did not suffer the harmful effects of depression and anxiety on their health to the same extent that women with weak networks did; they were also largely protected from the effects of internalizing on alcohol problems. One important question that deserves further empirical attention is what types of social support (emotional, distraction, informational; cf. Cutrona, 1996) these women are receiving from their friends and family that is having this buffering effect, specifically with regard to their physical health and their health behavior.

## Intervention Implications

The current study provides evidence of the utility of two potentially modifiable moderators of the effects of stress on health status and health behaviors—avoidant coping style and support networks. Given that coping mechanisms have been demonstrated to be responsive to intervention (Litt, Kadden, & Kabela, 2009; Merrill & Thomas, 2013; Vieten, Astin, Buscemi, & Galloway, 2010), and thus can influence decisions about stress reduction, future research should explore effective ways to produce these changes in coping style. One possibility suggested by recent research is that some Blacks respond to discrimination-based stress by increasing their levels of physical exercise (Corral & Landrine, 2012; Borrell et al., 2012). This type of “positive avoidance” might be particularly effective at tempering the negative emotional responses associated with a stressor that, realistically, cannot be addressed directly with most active coping strategies. FACHS research is examining this issue currently.

## Limitations and Future Directions

Some limitations of the research should be considered. First, as with many long-term prospective studies, some of the measures changed over time. The primary purpose of the T1 measures of health status and alcohol consumption in this study was to control for previous health behavior / conditions in the analyses; and the stability coefficients suggest they did this effectively. However, the fact that some of the items were not identical at T1 and T5 does limit comparisons of absolute amounts of change across time. Second, in spite of their face validity, the internal consistency of the moderator measures -- especially avoidant coping -- was low. This is a problem, and it suggests caution is warranted when interpreting the results. However, it is also a problem, in part, because low reliability tends to attenuate moderation effects, thereby potentially underestimating the relations that were found (Cohen, Cohen, West, & Aiken, 2002; Whisman & McClellan, 2005). Future research should employ more extensive coping and buffering measures than were available in this dataset.

Another issue to be considered is that the participants in this study were middle-aged Black women who lived in nonurban areas of two states; this raises issues of generalizability. In fact, there is reason to believe that Black men are more likely to respond to discrimination by externalizing and substance use (Cloninger, Sigvardsson, & Bohman, 1996). We did not have enough male PCs in FACHS to make these comparisons, however. Moreover, experiences of discrimination and reactions to it (including alcohol use) may vary as a function of minority status (Hatzenbuehler, in press) as well as geographical location (Gibbons et al., 2007). Future research should examine both men's and women's emotional reactions to discrimination and its impact on their health behavior and health status. Studies should also include other minority or stigmatized groups, and, to the extent possible, samples from other geographic areas.

Finally, the direct path from T2/3 discrimination to T5 health ( $p = .01$ ) raises another issue to be considered in future research with new methods. The current study employed self-reports of health status and alcohol consumption. Self-reports of morbidity have been shown to be good predictors of mortality (perhaps better than physician diagnosis), especially among Black Americans (Ferraro & Farmer, 1996); self-reports of substance use have been widely accepted as accurate, including among Black Americans (Wills & Cleary, 1997). However, recent advances in assessment of biological markers of substance use and morbidity are beginning to establish a new standard for studies like this. For example, the use of DNA and methylation-based indices to assess substance use (Beach et al., 2015; Philibert et al., 2016), and measures of allostatic load to examine the toll of chronic perceived discrimination on the body (Brody et al., 2014) will open the door to new research that can supplement data from self-reports (see Mendes & Muscatell, in press, for a review). Such methods may address this potentially very important question of why discrimination appears to have a direct effect on physiological health that may not be mediated by changes in affect or cognitions (Brondolo, in press; Simons, Lei, Beach, Cutrona, Gibbons, & Philibert, in press).



## Conclusion

Perceived racial discrimination is associated with increases in both internalizing and externalizing emotional responses, and these reactions, in turn, are associated with deterioration in health status and increases in unhealthy behavior (drinking frequency and problematic drinking). These relations between emotional response and health are buffered by the presence of support networks, and amplified by avoidant coping tendencies.

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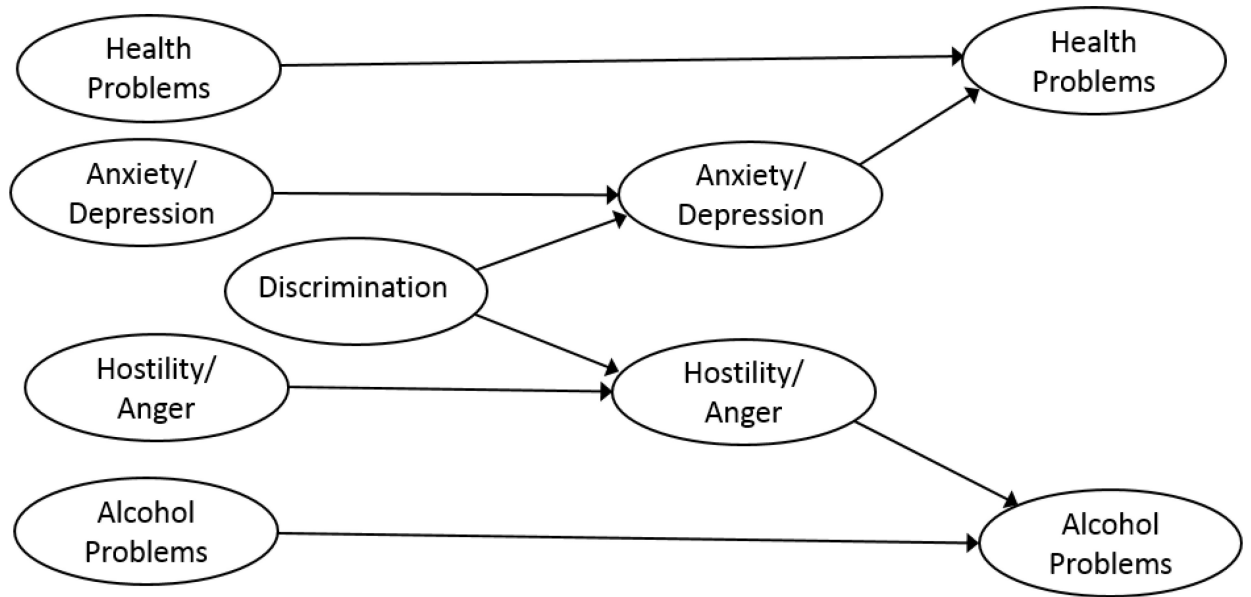


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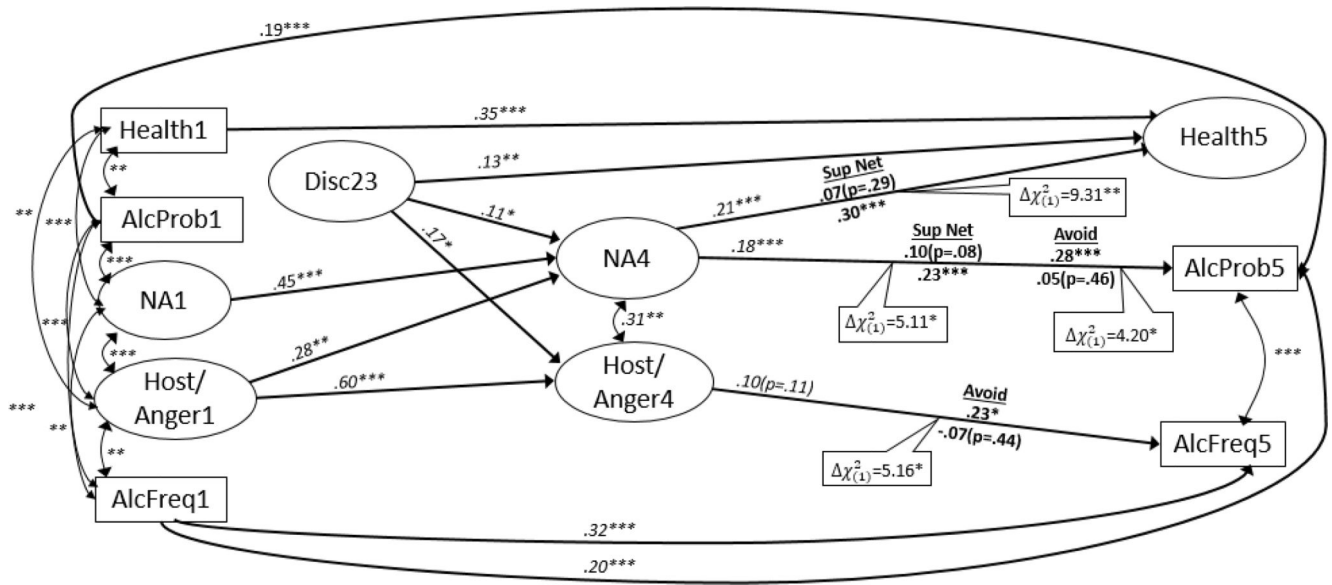
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**Figure 1.**  
Heuristic Model of the Differential Mediation Hypothesis(from Gibbons et al., 2014).

**Figure 2.**

Structural Equation Model of the Discrimination on Health Problems, Alcohol Frequency, and Alcohol Problems.

Note. Estimated path coefficients are completely standardized. Numbers in construct names indicate wave of measurement;

Disc = perceived racial discrimination; NA = anxiety and depression; Host/Anger = hostility/Anger

Heath = health problems; AlcFreq = alcohol frequency; AlcProb = alcohol problems

Bold coefficients are stacked on moderators (Sup Net = support networks, Avoid = Avoidant Coping), Above the line = High values/Below the line = Low Values

\*p .05; \*\*p<.01; \*\*\*p<.0001.

**Table 1**

Correlations Among Measurement Variables for Moderation Structural Equation Model

VARIABLE	1	2	3	4	5	6	7	8	9	10	11	12
1 NEGATIVE AFFECT T1												
2 HOSTILITY/ANGER T1	.23***											
3 HEALTH PROBLEMS T1	.26***	.11*										
4 ALCOHOL FREQUENT USE T1	.08	.14***	.06									
5 ALCOHOL PROBLEMS T1	.25***	.18***	.13***	.26***								
6 PERCEIVED RACIAL DISCRIMINATION T23	.08	.11*	.04	.01	.14***							
7 NEGATIVE AFFECT T4	.44***	.23***	.22***	.07	.21***	.18***						
8 HOSTILITY/ANGER T4	.12***	.36***	.11*	.03	.12***	.13***	.28***					
9 HEALTH PROBLEMS T5	.17***	.05	.43***	-.02	.15***	.18***	.26***	.16***				
10 ALCOHOL FREQUENT USE T5	.04	.08	-.10*	.33***	.13***	-.01	.05	.08	-.06			
11 ALCOHOL PROBLEMS T5	.20***	.12**	.06	.27***	.30***	.07	.22***	.09*	.05	.44***		
12 SUPPORT NETWORK T1	-.14***	-.09*	-.03	-.02	-.07	.02	-.07	-.05	.00	.02	-.11*	
13 AVOIDANT COPING T1	.21***	.09*	.19***	.07	.07	-.16***	.10*	.04	.03	.02	.09*	-.10*

Note: Higher scores indicate more of the construct.

\*  $p < .05$ \*\*  $p < .01$ \*\*\*  $p < .005$